UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: July 2,1987

SUBJECT: Unifirst Corporation - Woburn, MA
Sample Results

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UNIFIRST DATA + OFF-SITE PROGRAM

12 Soil Samples Analyzed from 4 borings

Soil Sample Results
UC4, UC5, UC6, UC7

For your review, enclosed are the sample results collected at Unifirst Corporation, Woburn, MA, in the month of November of 1986, specifically on these days 3, 4, 5, 10, and 17 in November.

During this period ~~four monitoring wells~~ (Wells UC4, UC5, UC6, and UC7) were installed on the property of Unifirst Corporation by the company's contractor, ERT. The well locations were selected on what was thought by Jeff Lawson of ERT and Dave Delaney of EPA to be locations of possible contamination. Figure I. illustrates the the well installation locations. In general, the drilling procedures included soil boring, soil sampling, classification, and field tests.

The soil samples collected via split-spoon procedures were visually classified and logged by Jeff Lawson of ERT. Each split-spoon sample collected were immediately split upon collection between ERT and EPA. Representative portions of each split-spoon sample was collected into pre-washed and baked 40 ml VOA vials and preserved on ice immediately upon collection. The split-spoon sampler employed by ERT was cleaned by Jeff Lawson before each sample was taken. The cleaning process consisted of initially rinsing the split-spoon sampler with wash water, then with methanol, and finally distilled water.

EPA portion of the split-spoon samples were contracted to EA Engineering, Science, and Technology, Inc. (Sample number 52958, 52959, 52960, 52961, 52962, 52963, 52964, and 52966) and California Water Labs (Sample number 63004, 63005, 63006, 63007, 63008, 63009, 63010, 63011, 63012, and 63012) for VOA analysis. In addition to split-spoon samples, Woburn water used occasionally during the drilling process (63005) and surface soil samples at Well UC7 (52959,52960,52961) were collected for VOA analysis. Duplicate samples were collected at Well UC7 (SS1 and SS1A, and #2 and #2A). The results for all these samples are shown on Table I. with another pertinent informations. Please note that those volatile organic compounds not listed in Table I. were excluded because they were found to be below the Contract Required Detection Limit (CRDL) and the specific detection limits for for each of the volatile organic compounds maybe found in Table II.

If you have any further question or require more information, please contact me at 861-6700 extension 234.

Add'l UC8 & UC9 data

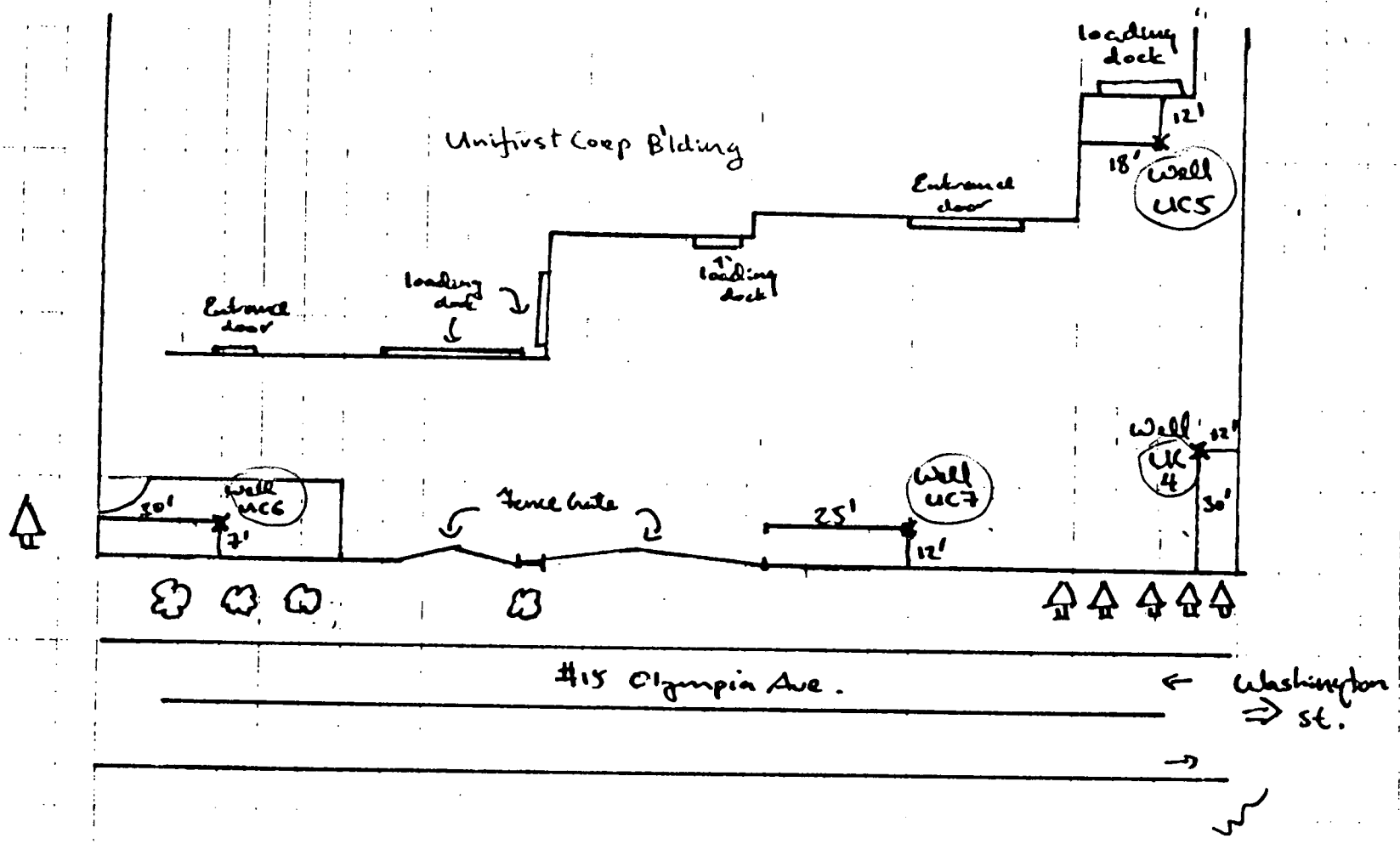


Fig I. Unifirst Corp.
Well installation locations.

Table I.
Unifirst Corporation - Volatile Organic Analysis
Results
(November 1986)

	Trip Blanks					Woburn Water	Well UC4 SS1
	#1	#2	#3	#4	#5		
Sample Number	63004	63006	63009	52958	52962	63005	63005
Date (yr/m/d)	861103	861104	861105	861117	861117	861103	861103
Time	07:45	07:10	07:10	07:05	07:05	12:05	11:30
Sample Matrix	Water	Water	Water	Water	Water	Soil	Soil
Depth (ft)	-	-	-	-	-	-	4-6
Volatile Compounds:							
Acetone	-	-	29 B	-	-	-	61 B
cis-1,3-Dichloro propene	6.1	-	-	-	-	-	-
Bromoform	9.0	-	-	-	-	-	-
1,1,2,2-Tetra chloroethane	10.0	-	-	-	-	-	-
Chloroform	-	-	-	-	-	9.6	-
Tetrachloroethene	-	-	-	-	-	-	8.8
Hexane	-	-	-	-	-	-	9

Note: Woburn water was occassionally used during the drilling process.
The estimated concentrations are in PPB.

Note: No Soil Contamination

Table I. (cont.)
Unifirst Corporation - Volatile Organic Analysis
Results
(November 1986)

	Well UC5		Well UC6				Well UC7		
	SS1	SS2	SS1	SS2	SS3	SS5	#1	#2	#2A
Sample Number	63007	63008	63010	63011	63012	63013	52959	52960	52961
Date (yr/m/d)	861104	861104	861105	861105	861105	861105	861110	861110	861110
Time	09:00	09:23	07:39	07:45	08:00	11:35	11:00	11:30	11:30
Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Depth (ft)	0-2	4-6	0-2	2-4	4-6	18-20	1	2	2
Volatile Compounds:									
Methylene Chloride	-	-	-	-	-	-	7 B	7 B	25B
Acetone	170B	105B	96 B	67 B	75 B	88 B	12B	8JB	10JB
1,1,1-Trichloro ethane	12	-	-	-	-	-	-	-	-
Tetrachloroethene	170	-	-	-	-	-	61	-	10
Toluene	6.0	-	-	-	-	-	-	-	-
Hexane	2.8	0.8	1.2	3	0.7	1	-	-	-
Ethane,1,1,2-Trichloro-1,2,2-Trifluoro	-	-	-	-	-	-	32	-	-

Note: Sample UC7-#2 and #2A are duplicate samples.
The estimated concentrations are in PPB.

Table I. (cont.)
Unifirst Corporation - Volatile Organic Analysis
Results
(November 1986)

	Well UC7			
	SS1*	SS1A	SS2	SS3
Sample Number	52963	52966	52964	52965
Date (yr/m/d)	861117	861117	861117	861117
Time	10:45	10:45	11:05	11:25
Sample Matrix	Soil	Soil	Soil	Soil
Depth (ft)	2-4	2-4	4-6	6-6.5
Volatile Compounds:				
Methylene Chloride		6 B	5JB	7B
Acetone		26B	20B	30B
Ethane,1,1-oxybis		10	-	-
Hexane		16	-	-

*Note: SS1 and SS1A are duplicate samples. Sample SS1 sample was not analyzed by the contract lab. The estimated concentrations are in PPB.

Table II.

Data Reporting Qualifiers

Value - If the result is a value greater than or equal to the Contract Required Detection Limit (CRDL), the value is reported.

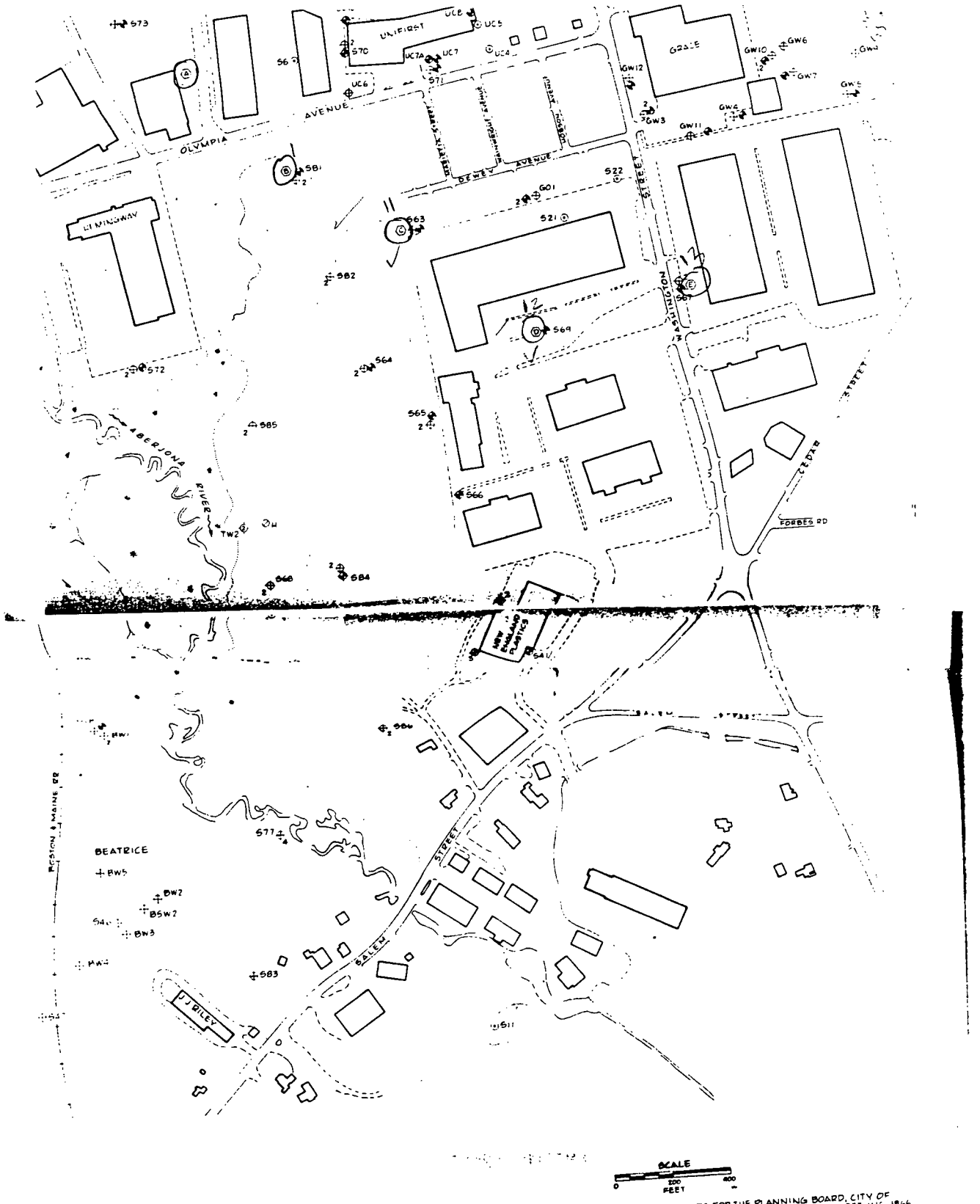
U - Indicates that the compound was analyzed for but not detected. The minimum CRDL for the sample with the U (e.g. 10U) is reported based on necessary concentration or dilution actions.

J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified CRDL but greater than zero.

C - This flag applies to pesticide parameters where the identification has been confirmed by GC/MS. Single component pesticides greater than or equal to 10ng/ul in the final extract should be confirmed by GC/MS.

B - This flag is used when the analyte is found in the blank as well as in the sample. It indicates a possible blank contamination and warns the user to take appropriate action.

Other - Other specific flags and footnotes may be required to properly define the results. If used, they must be fully described and such description attached to the data summary report.



EXPLANATION

- MONITORING WELL SCREENED IN BEDROCK
- MONITORING WELL SCREENED IN OVERBURDEN
- WATER WELL SCREENED IN BEDROCK
- ABANDONED WATER WELL SCREENED IN OVERBURDEN
- MONITORING WELL SCREENED IN BEDROCK & OVERBURDEN
- TEST WELLS & OBSERVATION WELLS
- INDICATES NUMBER OF WELLS SCREENED AT THAT INTERVAL
- PROPOSED MULTI-PORT GROUND-WATER SAMPLER

SCALE

0 200 400

FEET

1. BASE MAP FROM TOPOGRAPHIC MAPS FOR THE PLANNING BOARD, CITY OF WOBURN, MA., GRID NOS. 12, 13, 16, 17 BY LOCKWOOD, KESSLER & BARTLETT, INC. 1966 PHOTOREVISED BY THE U.S GEOLOGICAL SURVEY, SEPT., 1985, BASED UPON EPA/EPIC AERIAL PHOTOGRAPH UPDATE APRIL, 1985

2. THE FOLLOWING DESIGNATIONS APPLY TO THE INSTALLATION OF WELLS:

S1-22	EPA MONITORING WELLS INSTALLED BY ECOLOGY & ENVIRONMENT INC., 198
S23-62	PREVIOUSLY EXISTING WELLS
S63-86	EPA MONITORING WELLS INSTALLED BY NUS CORPORATION, DEC., 1984 - MAR., 198
TW	TEST WELLS INSTALLED DURING WATER WELL EXPLORATION BY THE CITY OF W
B	BEATRICE FOODS MONITORING WALLS INSTALLED BY WOODWARD CLYDE CONSULTANTS, SEPTEMBER, 1984 AND JULY, 1984
G	W R GRACE/CRYOVAC DIVISION MONITORING WELLS INSTALLED BY GEOENVIRONMENTAL CONSULTANTS 1983 & SEPT - OCT., 1984
IUS	INTERSTATE UNIFORM MONITORING WELLS INSTALLED BY ENVIRONMENTAL RESEARCH AND TECHNOLOGY, 1984.

ADDITIONAL INVESTIGATION
UNIFIRST CORPORATION
WOBURN, MASSACHUSETTS

The additional investigative tasks described below are based on the findings derived to date from the continuing investigation and discussions among UniFirst's technical consultants and the EPA. The tasks have been designed to fulfill the following objectives:

1. further investigate the nature and areal and vertical extent of ground water that bears dissolved constituents of the product; and

2. develop data for and design a cost effective remedy that will remove a substantial portion of the mass of product and effect ground-water gradient control such that ground water contaminated by the product and migrating off site is captured in the wells, withdrawn, treated as may be appropriate and discharged.

Perimeter Wells

Five deep (approximately 300 feet) multi-port ground-water sampling devices will be installed at the locations shown on the attached figure. The locations describe a rough arc in the vicinity of the distal edge of any suspected manifestations of ground-water contamination by compounds that have been found on site. Further, these locations are expected to be beyond any likely zone of free product migration. Sampling at distance and at depth will allow for interpretation of the areal and vertical extent of ground-water-borne compounds suspected to be migrating from the site, with minimal risk of drilling through free product. Generally, this array of wells will provide a dense network of sampling points that are: down or cross-gradient from UC8; topographically downslope; and at lower bedrock elevations.

A multi-port ground-water sampler will be installed at location A approximately 1000 feet due west of well UC8. This location is 300 feet west of EPA well S6 in which dissolved tetrachloroethene reportedly has been detected.

A multi-port ground-water sampler will be installed at location B adjacent to EPA wells S81, which are located 900 feet southwest and downgradient of well UC8. These wells comprise a nest of three; each of which has been reported to contain low levels of dissolved tetrachloroethene and 1,1,1, trichloroethane.

A multi-port ground-water sampler will be installed at location C adjacent to EPA wells S63, which are located 800 feet south-southwest and obliquely downgradient of well UC8. These wells comprise a nest of three; each of which has been reported to contain low levels of dissolved tetrachloroethene and inconsistently 1,1,1 trichloroethane.

1113E

A multi-port ground-water sampler will be installed at location D adjacent to well S69. This location is 1100 feet south of well UC8 and 400 feet south of W.R. Grace well G01. Well G01 is screened in shallow bedrock and has been reported to contain dissolved tetrachloroethene and 1,1,1, trichloroethane. Well S69 is screened in shallow bedrock and reportedly contains no dissolved volatile organic compounds.

A multi-port ground-water sampler will be installed at location E adjacent to wells S67, which are located 550 feet south of the W.R. Grace Cryovac Division plant and 1200 feet northeast and upgradient of the New England Plastics plant. The wells comprise a nest of three. The shallowest two wells of the nest reportedly contain low levels of 1,1,1 trichloroethane. It has been reported that tetrachloroethene has been unreliably detected once in the four reported sampling rounds at the method detection limit in the shallow well at S67.

Continued Sampling and Analyses at UC9 and UC10

Additional sampling of these deep multi-port devices is required to establish the vertical distribution of concentrations of dissolved compounds. This is essential because the borings were drilled with water and could not be purged upon completion in light of the proximity of UC9 to UC8 and the elevated concentrations encountered during drilling UC10. Purging may have further disturbed the ground-water system or accelerated migration of product or its dissolved constituents. The two month interval between installation of the wells and the proposed sampling may have provided sufficient time to allow stabilization of the ground-water system around the wells such that representative samples can now be obtained.

The rates of recovery of the various ports at UC9 and UC10 will be measured to determine the most transmissive zone(s) at depth. These zones will be candidate depths for screening in the proposed deep pumping well.

Pump Testing

The results of the perimeter-well installation, ground-water gradient measurements and ground-water quality data will provide the basis for selecting the areal and vertical placement of investigatory pumping wells. These wells will be nominally four-to-six-inch diameter wells into which appropriately sized pumps can be installed. It is currently anticipated that one or more of the shallow, large-diameter wells that will be installed pursuant to the Order will provide adequate shallow bedrock pumping-response

information. A deep pumping well will be located based on the results of the above described additional hydraulic and ground-water-quality testing of wells UC9 and 10. The results of these tests will indicate an appropriate depth of the screened interval.

Pumping from these wells in conjunction with measuring the effect on ground-water levels in other on- and off-site wells and changes in concentrations of compounds in the pumping wells' effluents should provide data sufficient for initial design of a ground-water recovery and treatment system that will be capable of controlling off-site migration of dissolved compounds and effect removal of a significant mass of the compounds.

Sampling and Analysis of New England Plastics Wells

It has been reported that low levels of dissolved tetrachloroethene and 1,1,1 trichloroethane have been detected in well No. 2 at the New England Plastics (NEP) plant. An earlier analysis of a sample from NEP well No. 1 reportedly manifested an unreliable concentration of tetrachloroethene near the detection limit of the method. In order to determine the vertical distribution of dissolved compounds at this location each of the three wells will be sampled at various depths. Since the wells are open to various depths (No. 1 - 358 feet; No. 2 - 500 feet; No. 3 - 940 feet) ground-water quality variations can be determined with depth by appropriately positioning a pump and sampling port at various depths within each well.

Unifirst

Tentative findings

SUMMARY OF
EPA METHOD 624 ANALYTICAL RESULTS
FOR GROUND-WATER SAMPLES

MICROGRAMS PER LITER (Parts Per Billion)

WELL NO.	DEPTH OF PORT[1]	DATE	TETRACHLOROETHENE	TRICHLOROETHENE	TRANS 1,2 DICHLOROETHENE	1,1,1 TRICHLOROETHANE	1,1 DICHLOROETHANE	TOLUENE	ACETONE
UC10[2]	N/A	5/27/87	420	12	ND	ND	ND	ND	ND
UC10-1	243	6/8/87	39	8	21	7	ND	6	ND
UC10-1		6/15/87	ND	ND	10	ND	ND	5	87
UC10-2	227	6/8/87	570	38	44	24	ND	ND	ND
UC10-2		6/15/87	22	ND	20	ND	ND	6	110
UC10-3	181	6/8/87	NOT SAMPLED[3]						
UC10-3		6/15/87	32	ND	14	ND	ND	7	ND
UC10-4[4]	158	6/8/87	480	31	24	ND	ND	245	ND
UC10-4		6/15/87	2300	ND	ND	ND	ND	140	ND
UC10-5[4]	129	6/8/87	760	ND	ND	ND	ND	ND	ND
UC10-5		6/15/87	880	40	27	ND	ND	25	ND
UC10-6	93	6/8/87	1400	86	48	32	8	16	ND
UC10-6		6/15/87	54	ND	ND	ND	ND	7	72
UC9-1	238	6/15/87	7	ND	ND	ND	ND	ND	ND
UC9-2	181	6/15/87	520	29	ND	ND	ND	ND	ND
UC9-3	149	6/15/87	40	ND	ND	ND	ND	6	ND
UC9-4	112	6/15/87	2500	ND	ND	ND	ND	ND	ND
UC9-5	60	6/15/87	NOT SAMPLED[3]						
UC9-6	37	6/15/87	ND	ND	ND	ND	ND	ND	ND

Notes:

1. Sampling port depths are given in feet below ground surface. The depths are rounded off to the nearest whole foot.
2. This sample was taken from the completed (total depth 243.5 feet) boring prior to installation of the Solinst device. Sample was taken by bailer through the drill rods from the bottom of the boring after bailing 30 times. This sample and its field blank contained 140 micrograms/liter and 54 micrograms/liter methylene chloride respectively. The shipping blank contained no detectable concentrations of volatile organic compounds.
3. Ports were not sampled because drive gas (Nitrogen) leaks in the system prevented obtaining a sample.
4. Samples from UC10 ports 4 and 5 taken on June 8, 1987 were somewhat frothy. Bubbles could not be eliminated entirely from the sample vials.
5. The field and shipping blanks for the June 8 and 15, 1987 sample contained no detectable concentrations of volatile organic compounds.
6. Sample ports were purged five times, except for the June 15, 1987 samples from UC10. Inadequate drive-gas reserve necessitated that ports UC10 3,4,5 and 6 be purged once, and that ports UC10 1 and 2 not be purged prior to sampling.
7. The detection limits vary substantially among the parameters analyzed for and the samples. Refer to the laboratory data sheets for specific detection limits.

ND - Not Detected